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ORIGINAL ARTICLE

Selective permeability of boundaries in a knowledge brokering team

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Knowledge brokering teams are increasingly deployed in the public sector to promote coordination and integration across previously separated practices. Permeability of external boundaries surrounding such teams is, however, often taken for granted and has so far received relatively little attention. To address this gap, this article presents the findings of an in-depth qualitative longitudinal case study of a knowledge brokering team operating in the fragmented healthcare context. It argues that boundary spanning, which increases the permeability of the team boundary, can coexist with the strategies of disengagement, such as boundary buffering and boundary reinforcement, which reduce permeability. The tension between these seemingly opposing strategies can be resolved through selective permeability, whereby the strength of the external team boundary varies depending on the out-group with which the team interacts, the out-group's mode of participation, the individual boundary spanner(s) deployed and the stage of the boundary spanning project.

1 | INTRODUCTION

The public sector is being transformed by postmodern patterns of organizing, including hybrid, network-based and temporary arrangements where collaboration, governance and partnership unfold across multiple boundaries (Williams 2012; Calvard 2014; Quick and Feldman 2014; Bucher et al. 2016). This has led to the growing interest in the phenomenon of boundary spanning, which occurs when individual or collective agents connect entities separated by a boundary by negotiating the meaning and terms of the relationship between them (Levina and Vaast 2005; Kislov et al. 2017a). Policy initiatives increasingly rely on formally designated boundary spanning agencies, teams and roles to increase the permeability of 'sticky' boundaries and thus promote integration, coordination and joint working between different organizational and professional groups (Williams 2012).

Previous studies suggest that the locus of boundary spanning activities has migrated from the organization (Fennell and Alexander 1987) to the work unit level (Yan and Louis 1999; Cross et al. 2000; Edmondson 2002) and that boundary spanning is an inherently collective phenomenon unfolding in 'broker chains' (Waring et al. 2013) or

'systems of boundary bridges' (Kislov et al. 2016). Despite the calls for the deliberate cultivation of 'knowledge brokering teams', that is, teams that not only operate at the interface of multiple professional and/or organizational boundaries but also have boundary spanning activities as part of their formal remit, most of the existing research tends to focus on individual knowledge brokers acting within or between organizations (Kislov et al. 2017b). At the same time, studies conducted in teams operating across boundaries are mostly preoccupied with the dynamics of intra-team boundary crossing, rather than exploring issues pertaining to the external team boundary and its permeability (Edmondson 2003; Oborn and Dawson 2010; Drach-Zahavy 2011; Edmondson and Harvey 2017).

Exploring these issues is, however, of significant importance due to the tension which stems from the dual nature of boundaries as both junctures and barriers (Lamont and Molnár 2002; Kislov 2014; Quick and Feldman 2014) and is particularly prominent in teams with a formally designated boundary spanning function. On the one hand, positive effects of boundary spanning on team performance are contingent on the degree to which the external team boundary is permeable to knowledge flows (Workman 2005; Drach-Zahavy 2011). On the other hand, in addition to boundary spanning, teams partake in 'strategies of disengagement', such as boundary buffering and boundary reinforcement. These types of 'boundary work' (Gieryn 1983) are crucial for protecting the team and fostering shared identity but significantly reduce the permeability of its boundary (Faraj and Yan 2009). While it has been proposed that strategies of engagement and strategies of disengagement compete against each other (Choi 2002), their interaction at the same team boundary has so far received little empirical attention (Dey and Ganesh 2017).

This article addresses the following research questions. What is the interplay between different types of boundary work in knowledge brokering teams? How does this interplay influence the permeability of the team boundary? How do these phenomena change over time? It draws on an in-depth qualitative longitudinal case study of a knowledge brokering team located within a large-scale collaborative partnership between a university and healthcare organizations whose task was to improve the provision of healthcare services to patients with heart failure. It shows that the tension between different types of boundary work can be resolved through selective permeability, whereby the strength of the team boundary may vary significantly depending on the out-group with which the team interacts, the out-group's mode of participation, the individual boundary spanner(s) deployed and the stage of the boundary spanning project.

2 | LITERATURE REVIEW

2.1 | Boundaries and knowledge brokering teams

Boundaries are frontiers or demarcations delimiting the perimeter and scope of a given domain (Kreiner et al. 2009), reflecting the sociocultural differences between groups and potentially leading to discontinuities in action or interaction (Akkerman and Bakker 2011). They are central to organizational life, and their nature is dual (providing both positive and negative effects on learning, knowledge sharing and implementation of change), composite (creating complex boundary systems through intersection), and dynamic (subject to construction and reconstruction) (Hernes 2004; Kislov 2014). Boundaries can also be viewed as 'conceptual distinctions made by social actors to categorize objects, people, practices, and even time and space' (Lamont and Molnár 2002, p. 168). Existing both between and within organizations (Schotter et al. 2017) and professions (Powell and Davies 2012), they demarcate flows of authority, decisions and knowledge, defining work roles and relationships and signalling what is and is not allowed (Dougherty and Takacs 2004).

These characteristics often put boundaries at the centre of political struggles between social groups, making them an object of contestation (Lamont and Molnár 2002). While such contestation is often triggered by internal struggles for authority, domination and power, it often unfolds in response to external stimuli, such as technological innovation, organizational restructuring or policy change (Allen 2000; Burri 2008). The global policy trend towards interprofessional and inter-organizational collaboration and network forms of governance creates the need for

boundary spanning (van Meerkkerk and Edelenbos 2018), that is, actions and behaviours aimed at connecting previously separated practices by negotiating the meaning and terms of the relationship between them, and facilitating the sharing of knowledge across social context (Kislov et al. 2017a; Levina and Vaast 2005; Roberts and Beamish 2017).

Many contemporary organizations choose to cultivate knowledge brokering teams to increase their peripheral vision and awareness (Cunha and Chia 2007) and to enhance coordination, integration and joint working across boundaries (Drach-Zahavy 2011).¹ Compared to other teams, knowledge brokering teams rely heavily on boundary spanning activities to accomplish their tasks and achieve outcomes that are valued by stakeholders (Cunha and Chia 2007). Aiming to establish linkages and manage interactions between the team and its external environment, these activities have been classified into: (1) general information search, including actions that access external parties for general or technical knowledge and skills; (2) coordination of task performance with interdependent entities to negotiate and accomplish shared goals; and (3) representation, which involves persuading others of team decisions, requesting resources and protecting the group (Marrone 2010).

Previous research has focused predominantly on the task-based, team-level and contextual antecedents and consequences of team members' boundary spanning behaviours (Joshi et al. 2009). It has shown that knowledge brokering teams are often characterized by high levels of external activity, extensive ties, expandable structures, and flexible membership (Ancona et al. 2002; Calvard 2014). Team members' shared perceptions about the strategic importance of maintaining the external focus act as an antecedent of team-level boundary spanning, while the consequences of the latter include an increase in team performance and a decrease in the role overload experienced by individual team members (Marrone et al. 2007). At the same time, this strand of research tends to underplay the effects that the dual, contestable and dynamic nature of boundaries may exercise on the processes and outcomes of team boundary spanning. This is discussed in more detail in the next subsection.

2.2 | Boundary work and boundary permeability

To explore the management of contestable boundaries, it is useful to view boundary spanning as part of the broader notion of boundary work, denoting a wide range of strategies used to establish, obscure or dissolve distinctions between groups of actors (Gieryn 1983; Quick and Feldman 2014; Bucher et al. 2016). This concept was introduced by Gieryn (1983) in his seminal study of the boundary between science and non-science, whereby the scientists used a range of (flexible and arbitrary) discursive techniques to expand, monopolize or protect their jurisdictions from the non-scientists. It was later extended to embrace not only rhetorical devices, but also actual work practices used either to establish demarcations between different professional groups (Allen 2000; Burri 2008) or to bridge them, thus maintaining the 'negotiated order' within organizations and broader social fields (Guston 1999; Mørk et al. 2012). Although boundary work often remains hidden (Cross et al. 2000), it is crucial for acquiring and maintaining legitimacy, power and control (Bucher et al. 2016; Calvard 2014).

Organizational teams engage in several types of boundary work. In addition to boundary spanning, representing a strategy of engagement, these include boundary buffering (an outward-facing strategy of disengagement through which the team closes itself off from exposure to its environment to protect itself against external uncertainties and disturbances), and boundary reinforcement (an inward-facing strategy of disengagement through which the team sets and reclaims its boundaries and thus sharpens its identity from within) (Faraj and Yan 2009; Cross et al. 2000).² This has two important implications for the analysis of knowledge brokering teams. First, such analysis should refer to all

¹This article follows Kislov et al. (2016) in conceptualizing knowledge brokering as a form of intentional boundary spanning which is based upon an expectation that the brokered knowledge will be used in the policy and practice decisions, ultimately influencing the opinions and actions of knowledge recipients.

²Despite their differential effects, both strategies of engagement and strategies of disengagement are underpinned by similar mechanisms, involving accumulation, mobilization and conversion of several forms of capital unfolding at the intersection of interconnected social fields (Burri 2008; Kislov et al. 2017a).

activities that the teams engage in to manage their boundaries, including the intra-team, inward-facing processes of forming and enforcing the team norms, vision and identity (Drach-Zahavy and Somech 2010). Second, as boundary work involves both strategies of engagement (emphasizing the role of boundaries as junctures) and disengagement (relying on boundaries as buffers) (Lamont and Molnár 2002; Quick and Feldman 2014), these activities are likely to have differential effects on the permeability of the team boundary.

'Boundary permeability' has been defined as the propensity of boundaries to regulate the flow of information, resources and people (Dibble and Gibson 2018) and as the degree to which a given bounded domain is open to influence from other bounded domains located within its environment (Kreiner et al. 2006). Boundaries occupy a continuum from 'thin'/weak (open to external influence or integration) to 'thick'/strong (closed to external influence and blocking knowledge sharing) (Kreiner et al. 2006; Edmondson and Harvey 2017). Boundary permeability is influenced both by team-level factors (such as the diversity of team membership and leadership style) and the broader context (e.g., integration with other teams) (Workman 2005; Dibble and Gibson 2018; van Meerkerk and Edelenbos 2018). It is possible to distinguish 'closed' teams that have few linkages and low interdependence and 'open' teams, characterized by permeable boundaries and an intensified exchange of knowledge with the out-groups (Workman 2005, 2007).

By focusing on the interplay between boundary work and boundary permeability in a formally designated knowledge brokering team, this study addresses the following research gaps. First, previous research on boundary work has put particular emphasis on identifying and delineating its ideal types, with strategies of engagement (Quick and Feldman 2014) and disengagement (Lynn 2005) often treated separately, whereas the interplay between these seemingly opposing strategies remains largely overlooked (Hernes 2004; Dey and Ganesh 2017). Second, the extant literature often takes for granted the 'open' culture of knowledge brokering teams and the 'thin' nature of their boundaries, paying little attention to other forms of boundary work that are likely to exercise adverse effects on the permeability of team boundaries. Finally, as both boundary work (Bucher et al. 2016) and boundary permeability (Dibble and Gibson 2018) are likely to evolve over time, more research is needed to explore the temporal dynamics of their relationship (Faraj and Yan 2009) as well as the changing nature of individual team members' contributions to boundary work (Kislov et al. 2017a).

3 | CASE AND METHOD

3.1 | Research setting

A qualitative longitudinal single case study was conducted in 2010–13 in a multiprofessional project team (subsequently referred to as 'the Heart Team') working within a large-scale UK-based collaborative research partnership ('Collaboration') between a university and the National Health Service (NHS) organizations aiming to improve the utilization of applied health research in day-to-day clinical practice. It worked alongside three other 'implementation teams' that were also part of the Collaboration but focused on different areas of cardiovascular medicine. All four teams were overseen by the same executive group, often dealt with the same stakeholders and were expected to engage in cross-project learning, jointly contributing to the implementation strategy of the Collaboration.

The Heart Team was formed in 2009 with a broad remit of creating a collaborative programme of work focusing on improving the provision of healthcare services to patients with heart failure across one of the UK regions. It was led by a nursing academic and included a number of managers, a business school academic and a data analyst, with the subsequent inclusion of heart failure specialist nurses. As shown in Table 1, the project implemented by the team went through several phases, which I group into the 'earlier' (design and piloting) and 'later' (implementation and spread) stages, adopting the terms commonly used by the Heart Team members themselves and agreed with them formally during the focus group.

TABLE 1 Development of the Heart Failure project

		Earlier stages		Later stages	
		Design (2009–10)	Piloting (2010–11)	Implementation (2011–12)	Spread (2012–13)
Key boundary spanning activities	General information search	Stakeholder mapping and interviewing	Pulling together information from different sources to design the electronic version of the auditing tool	Seconding several heart failure specialist nurses to contribute specialist expertise to audit and feedback	Collecting information about the preferences and needs of general practices and healthcare commissioners to simplify and automate the tool
	Coordination of task performance	Negotiating the initial focus and scope of the project	Piloting the tool with the clinical and managerial staff in the selected group of general practices	Organizing education, training and feedback sessions for general practice staff	Putting together the improvement package delivered to the general practices
	Representation	Engaging with a broad range of stakeholders	Recruiting general practices for participation in the project	Relationship building with the selected stakeholder groups	Engaging with the commissioners of health services to receive funding and support
Change introduced in primary care organizations		Designing the initial version of the auditing tool	Developing the electronic version of the auditing tool with the first cohorts of patients benefiting from clinical audit	Using the electronic tool for audit and re-audit in several groups of general practices in the same locality	Spreading the audit to other geographical localities, with more heart failure patients receiving improved services
Team composition		<ul style="list-style-type: none"> – Clinical academic – 3 managers – Business school academic – Data analyst 	<ul style="list-style-type: none"> – Clinical academic – 3 managers – Business school academic – Data analyst – Seconded heart failure specialist nurse 	<ul style="list-style-type: none"> – Clinical academic – 3 managers – Business school academic – Data analyst – 3 seconded heart failure specialist nurses 	<ul style="list-style-type: none"> – Clinical academic – 5 managers – Business school academic – Data analyst – 5 seconded heart failure specialist nurses

3.2 | Intra- and extra-organizational context

The single case study approach was selected for the following reasons. The Heart Team granted me broad access to regular team meetings as well as to their 'boundary interactions' with various external stakeholders to collect research material prospectively and longitudinally. Most importantly, it provided a theoretical case suitable for an in-depth exploration of boundary work undertaken by the team in relation to various extra-organizational groups (such as doctors, nurses and NHS managers), located both in primary and secondary sectors of healthcare, and intra-organizational groups, represented by the other three implementation teams within the Collaboration (Figure 1). This meant that, in contrast with previous studies, the boundary of the Heart Team could be examined holistically, both within the inner (intra-organizational) and outer (extra-organizational) context.³

³As the notions of boundary work and boundary permeability refer to the *external* team boundary, an in-depth exploration of internal inter-professional boundaries within the team lies outside the scope of this article; these internal distinctions will only be considered here when they have a direct influence on team boundary work (see appendix 2 for examples).

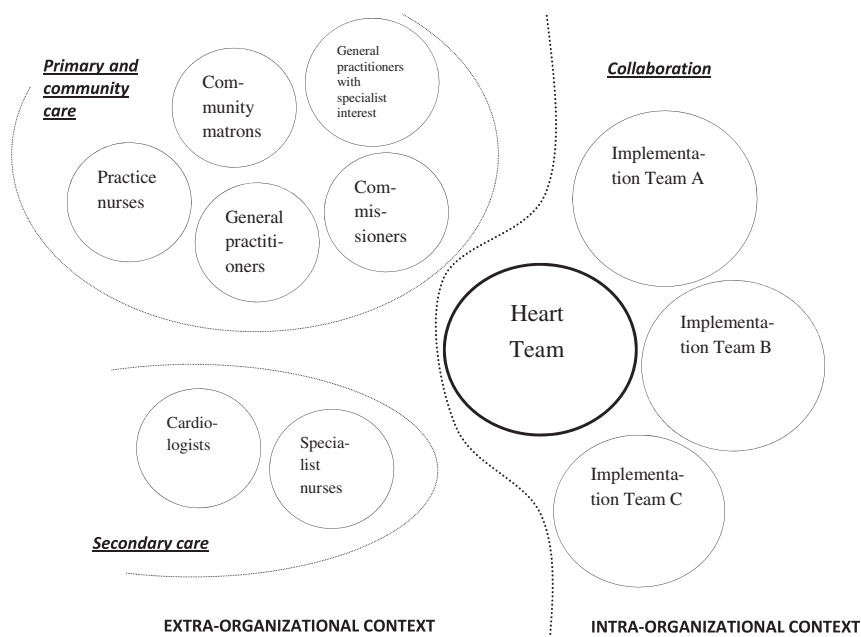


FIGURE 1 The Heart Team in extra- and intra-organizational context

The broader context is characterized by a number of features. First, the field of healthcare presents a sharply demarcated and fragmented boundary system, where strong boundaries exist between (and within) different professions, organizations and sectors, with numerous collective agents striving to maintain or extend their jurisdictions (Bucher et al. 2016). Second, these struggles are made even more acute by government-led initiatives (of which the Collaboration is a typical example) aiming to alter professional and organizational jurisdictions in order to improve the efficiency and effectiveness of health service provision (Kislov et al. 2017a). Finally, although the task of the Heart Team was to bridge multiple boundaries, primary care organizations ('general practices') were the main organizational beneficiaries of its activities, effectively positioning the knowledge brokering team as an external change agent (Glaser et al. 2015; Roberts and Beamish 2017).

3.3 | Data collection and analysis

Thirty-seven semi-structured interviews (30–90 minutes in duration) were conducted with the Heart Team members as well as with representatives of different professional and organizational groups with whom they interacted. The interviews were undertaken (face-to-face or by phone) in two rounds (2010–11 and 2012–13) to enable longitudinal analysis (Table 2), with some respondents interviewed in both rounds. At the end of the fieldwork a 90-minute focus group was held with the core members of the Heart Team, aiming to elicit their reflections on the development of the project over time. Non-participant observation (88 hours throughout 2010–13) of team meetings, learning events, interactive workshops and feedback sessions served as the supplementary method of data collection, providing opportunities for clarification and triangulation. Analysis of project documentation and regular informal conversations with research participants further enriched the interpretation of the case.⁴

⁴The validity of the research findings was further enhanced by member-checking, whereby the Heart Team members were given an opportunity to comment on three earlier iterations of this manuscript, ensuring the factual accuracy of the empirical account as well as the adequacy of theoretical interpretation.

TABLE 2 Interviews with research participants

	1st round of interviews (2010–11)	2nd round of interviews (2012–13)	Total
Managers	3	5	8
Academics	3	2	5
Specialist nurses	5	4	9
Practice nurses	–	3	3
NHS managers	2	2	4
GPs	3	5	8
<i>Total</i>	16	21	37

The interviews were digitally recorded and transcribed verbatim; transcripts and field notes were coded and analysed with the aid of NVivo. The first stage of data analysis was predominantly inductive, involving a series of emergent descriptive codes and following a narrative analytical strategy that aimed at the construction of a detailed story from the raw data. The second stage of analysis involved a shift towards an ‘interpretative/theoretical case’ (Pettigrew 1990, p. 280), aiming to link the emerging narrative with the deductively produced theoretical framework and wider debates in the literature on boundaries. This involved the re-coding of the dataset, with most of the codes derived from the literature reviewed in the previous section (see appendix 1 for examples). Matrix analysis was used to compare and contrast the coded material across (1) different aspects of the team boundary, namely the extra-organizational boundary at the team’s interface with external stakeholders and intra-organizational boundary with the other three implementation teams; (2) different stages of the project; and (3) different types of boundary work, with a particular emphasis on the development of boundary permeability over time (Nadin and Cassell 2004) (the final matrix summarizing the findings of the study is presented in appendix 2).

4 | FINDINGS

4.1 | Extra-organizational team boundary

4.1.1 | Earlier stages

The initial stage of the project involved an inclusive approach to engagement with a broad range of stakeholders. The Heart Team conducted a mapping exercise, identifying the key stakeholders in the field of heart failure, followed by a series of individual meetings and wider stakeholder events bringing together different professional groups (e.g., GPs and nurses), healthcare sectors (primary, secondary and community care), organizations (hospitals and general practices) and geographical areas. This approach, however, had to take into account multiple boundaries existing in the heart failure landscape. First of all, the team did their best to avoid violating the jurisdictions of powerful groups who could potentially see the newly developed project as a threat:

... When [the Heart Team] first came into being, I did wonder what was it that they were going to do that was going to be different to what we were going to do, and was there going to be some conflict? (NHSM1)⁵

This was achieved by articulating the shared interests and mutual benefits arising from collaboration and highlighting the complementary nature of the project in relation to other initiatives ongoing in the field of heart failure. In

⁵The following abbreviations are used throughout this section to indicate the research participants: BMA—Business and management academic; CA—Clinical academic; M—manager (in the Heart Team); NHSM—NHS manager; SN—specialist (heart failure) nurse.

addition, special arrangements occasionally had to be made to enable the representatives of less powerful professional groups, such as nurses, to voice their concerns:

... We held two big stakeholders events, there's about twenty-five people that came ... and certain clinicians, mainly consultants ... dominated the conversations ... And so after that we've actively made the decision to go and speak to those people on an individual basis or in smaller groups. (M1)

As far as the contributions of individual team members were concerned, representation at the senior level of the NHS was mainly conducted by the clinical lead of the project. At the level of the general practices, however, boundary spanning was undertaken by the managers and the specialist nurses acting either as a 'broker chain' (Waring et al. 2013) or in parallel:

[Another manager] and I—between us we'd contact practices. [He] would send out a letter recruiting them, but then I'd contact practices to set up meetings to go in and speak about the project and try and recruit them. We did it between us, and then I'd go in with [the specialist nurse] and because it was in the early stages, because it was being developed, we would do [the audit] together ... (M2)

In their regular fortnightly meetings the team members engaged in the collective discussions to creatively synthesize the opinions of multiple players: for instance, the inaccuracy of heart failure registers was first highlighted by hospital consultants and was taken forward despite being disputed by some GPs. The choice of facilitated audit as a method of addressing this problem emerged after one of the GP commissioners mentioned in a stakeholder meeting that 'doing your own audit is useful but it's difficult to find time to do it'. Improved management of heart failure patients in primary care, which was advocated by GPs with specialist interest, was added to the list of project goals despite the cardiology consultants being sceptical about the ability of primary care clinicians to manage patients with heart failure.

Despite the opportunities to feed their ideas into the development of the project, some of the stakeholder groups were, however, excluded from actively participating in its implementation. This exclusion often followed from the existing distribution of power and interests in the primary care sector rather than being actively enacted by the Heart Team. For instance, generalist staff, such as practice nurses and community matrons, were not actively involved in the delivery of the audit because heart failure specialist nurses, who started to emerge as the key stakeholders in the project, did not support this idea:

So that would either be a GP who's got an interest in cardiology, in-house, or a specialist nurse. You couldn't ask a modern matron to go in and run the search. (SN1)

4.1.2 | Later stages

The implementation and spread phases of the project were characterized by two important developments. First, there was a marked shift from broad (but relatively shallow) inclusivity described in the previous subsection towards a more narrow but focused approach to boundary spanning. Three external groups particularly stood out in this respect: heart failure specialist nurses, GPs with a special interest in heart failure, and commissioners based in clinical commissioning groups (CCGs).⁶ At the same time, multiple contacts and relationships that were developed in the initial stage were now discontinued either because they were seen as unproductive or because of the emerging clashes of interest with some of the stakeholders:

⁶Clinical Commissioning Groups (CCGs) are groups of general practices whose governing bodies are responsible for commissioning the majority of health services in England.

We had a document that [one of the partners] had developed for us but in hindsight this was no use at all. (M3)

There are a few [doctors] who ... want to have control over the situation. ... So they've excluded [the Heart Team] but commissioned somebody else to come and do their heart failure registers. (SN7)

The second development was concerned with attempts to bridge the generalist–specialist boundary that, paradoxically, was reinforced in the process of project implementation. Over the course of the project, the role of the heart failure specialist nurses significantly increased: they became formally seconded to the Heart Team and were instrumental in providing education to the project beneficiaries and implementing the audit of heart failure registers. As a result, while the beneficiaries of the projects were located in general practices, that is, in the primary care sector, it was heavily contingent on specialist input from the nurses based in secondary care, with the input of the general practice staff in the audit process remaining rather limited:

... We know that whatever does get implemented is more likely to be accurate because someone with a specialist background has been through it with a fine tooth comb and put together very specific recommendations on the back of that. But obviously, at the same time, the members of [general practice] staff that are concerned with the work have less input into the outcomes and probably pick up a little bit less as a result. (M5)

A number of steps were taken to ensure that the specialist–generalist boundary remained relatively permeable. To prevent the educational sessions becoming 'too specialized', local GPs were asked to co-deliver them with the specialist nurses. In addition, following the audit process, the feedback sessions were arranged by the Heart Team at each general practice. In these feedback sessions, the individual contributions of the team members were characterized by increasing specialization, with the specialist nurses being in charge of clinical tasks related to the audit and the managers providing administrative coordination and support:

I support the heart failure nurses ... going through all the audit findings with them. It's kind of supporting that process, whereas the facilitation with the practices is very clinical in nature, and my role is setting up that clinician-to-clinician facilitation. ... So it's building that bridge between the two groups and save them doing the admin tasks ... (M4)

Finally, managers became increasingly involved in boundary spanning between the Heart Team and the senior level of primary care commissioning, whereas the representational role of the clinical lead has become less prominent:

... I probably spent more time out and about and talking to [senior] people when we first started, and certainly as [the managers] were getting up to speed and figuring out their roles and what they were going to do ... Now I don't feel like I'm the one that has to go and talk to people about our work because I'm afraid that they'll say the wrong thing, because they won't: they know exactly what's going on ... (CA1)

4.2 | Intra-organizational team boundary

4.2.1 | Earlier stages

Other implementation teams working alongside the Heart Team in the same Collaboration were separated from the project despite their shared focus on bridging the boundary between research and practice, common organizational context, partially shared stakeholders and the expectation that they would utilize the same methodological approach and partake in cross-project learning. Although the majority of the Heart Team members had some knowledge about

what and how the other teams were doing, this information was often incomplete. Some techniques and methods utilized by the other teams were repeatedly mentioned in the meetings (e.g., 'we could use those tips in our work') but were never used in actual practice; some were rejected straight away as 'too formalized' and, therefore, unsuitable for the inclusive stakeholder-oriented approach taken by the Heart Team.⁷

This happened despite the fact that the four implementation themes were arranged by the leadership of the Collaboration into a matrix structure, with formal cross-team interactions organized along functional lines. Each of the three main professional groups, namely managers, clinical academics and management academics, had their own separate meetings. However, these meetings, as suggested below by one of the Collaboration's senior leaders, were not particularly effective for cross-team boundary spanning:

[Managers] had these learning sessions ... but at those they didn't share much ... *Clinical leads* met together only at the [senior leadership team meetings], which isn't enough of a forum for them to share what they're doing; but then all our clinical leads ... like doing their own thing in their own world ... *[Management academics]* did meet together quite regularly ... that was the forum where we got most interchange about crossovers ... but they got frustrated when that couldn't then be translated back into the teams on the ground actually working together more and sharing more ... (BMA2)

A number of reasons behind these developments have been suggested by the research participants. Many of them emphasized—and possibly exaggerated—the differences between the Heart Team and the other implementation teams. The resulting development of a distinct team identity was seen as beneficial for effective boundary spanning with external stakeholders but had a negative effect on the identification with (and boundary spanning within) the Collaboration as a whole:

... Our team works very different from how everyone else works. ... We have an awful lot more acceptance and probably commitment of the local heart failure clinicians than other projects do have. (M1)

... If you pushed me and said, 'Okay, where do you see yourself?' I suppose because I have got such a lot of working knowledge, an affinity with the people in [the Heart Team] then that would be my first point of identity. (BMA1)

Some research participants noted the lack of incentives for participating in the intra-organizational boundary spanning activities accompanied by the increasing competition between the implementation teams:

... [The Collaboration] at one point got quite competitive, and it almost seemed to be that at some stages people in the newsletter were saying, 'We've done this and we've done that', and you sort of felt, 'Oh my God, then what have Heart Failure done?' (BMA1)

Finally, the lack of functional integration and shared practice(s) at the ground level as opposed to creating cross-cutting structures, which often relied on team members who were rather peripheral to the task at hand, was also seen as a barrier:

... There was lots of learning and similarity that we weren't picking up on because we weren't integrating at what I'd call the core team level: the people doing the stuff every day as opposed to the clinical leads and the academic leads who were dipping their toes into it. (BMA2)

⁷Engagement in boundary reinforcement described here was not unique to the Heart Team, and similar developments were happening at the time in the other three implementation teams. An in-depth analysis of organizational factors contributing to team-level boundary reinforcement is described in my earlier work (Kislov 2014).

4.2.2 | Later stages

Halfway through the project it became apparent that the salient intra-organizational boundaries between the implementation teams had negative effects on knowledge sharing, organizational learning and integration of project work:

[Integration] has been very difficult because there were very ingrained ways of working ... Now we're moving to a single theme, single stakeholders, and single communication route, because that was one of the things we did wrong ... (BMA2)

A number of steps were taken at the organizational level to increase the permeability of the intra-organizational boundaries, such as the introduction of regular cross-project meetings, the involvement of representatives from other teams as peer reviewers and 'critical friends', and, most importantly, the rotation of managerial staff across the teams. These measures improved knowledge sharing between the teams, increased the Heart Team members' awareness of hidden problems and unintended consequences of their boundary activities and resulted in a number of improvements, particularly in relation to the usability of the auditing tool, thus contributing to bridging the generalist/specialist boundary described in subsection 4.1.2:

... You get so engrossed in your own project that sometimes you can't see things that need improvement. So we asked a couple of the team members from the [other implementation] team to come in and try and use the tool, and we realized that it's not as easy as we think, for somebody without any knowledge of it to undertake. So it's interesting to get other people in with a fresh pair of eyes ... to have a look at your project and highlight things that are good and bad about it ... (SN5)

Most of these improvements, however, remained rather incremental and did not seem to have a transformative, 'boundary-shaking' effect on the intra-organizational boundary. At the same time, they decreased inter-team competition and shifted the emphasis of cross-team comparisons from 'differences' to 'commonalities':

... I can't say that there was anything that was just sort of brought over wholesale, either direction, but when we discussed [with the other implementation teams] what we were doing, it seemed that what we were doing was fairly similar, and we could learn from ... (CA1)

Interestingly, this organizationally mandated boundary reconfiguration had differential effects on different members of the Heart Team. Those core managerial members of the team who both retained their engagement with the Heart Team and took part in new cross-team projects became the key internal boundary spanners, brokering contextual and managerial knowledge between the previously separated teams:

[The specialist nurses] are working very, very independently ... I will go and spend whole days with [them]. ... It does give them some contact with the wider 'what's going on'. (M4)

By contrast, the clinically focused members of the Heart Team, such as specialist nurses, still perceived the Collaboration as 'divided' and, as shown in the previous quote, relied on the managers to span the intra-organizational boundary:

I'm aware of people in the [other Collaboration teams], but I don't actually know what they do. ... I think myself and the [managers] and the other nurses, I do feel part of a team ... I'm not sure about the wider [Collaboration] really, because it's divided. (SN8)

5 | DISCUSSION

5.1 | Interplay between different types of boundary work

Previous research has proposed that, as organizations move from a functional to a team-based structure, boundary work migrates downward to the team level, resulting in the increased involvement of teams in boundary spanning and boundary reinforcement activities (Yan and Louis 1999; Cross et al. 2000). This study extends and develops this line of argument for knowledge brokering teams, addressing the call to explore the mutual relationships between different types of boundary work (Drach-Zahavy and Somech 2010). Despite their explicit focus on boundary spanning, that is, a strategy of engagement aimed at connection and exchange, knowledge brokering teams still deploy boundary buffering and boundary reinforcement, that is, strategies of *disengagement* aimed at differentiation and protection (cf. Faraj and Yan 2009; Schotter et al. 2017). Furthermore, by being directed at different out-groups, the strategies of engagement and disengagement can coexist at the same team boundary without cancelling each other out, with the strategies of disengagement exercising both negative and, rather unexpectedly, positive influences on boundary spanning (Figure 2).

Boundary buffering is often viewed as the direct opposite of boundary spanning, with organizations, for example, making a choice between either 'buffering' or 'bridging' activities (Fennell and Alexander 1987, p. 457). By contrast, I show that buffering, which is apparent, for example, in the way hospital consultants and community matrons were excluded from the project, can be deployed to protect boundary spanning activities with other out-groups (such as GPs and specialist nurses) as well as to narrow the scope of such activities, reflecting the team's adaptation to the complex relationships between multiple groups of external stakeholders. However, while it could be expected from the literature that it is the least powerful groups that become marginalized in multidisciplinary work (Oborn and Dawson 2010), this study shows that the most powerful groups (hospital consultants) can also be side-lined if the knowledge brokering team is outside of their direct sphere of influence and if an (informal and often implicit) alliance is formed between the knowledge brokering team and other locally important external stakeholders. This suggests that creative utilization of the interplay between boundary spanning and boundary buffering may enable knowledge

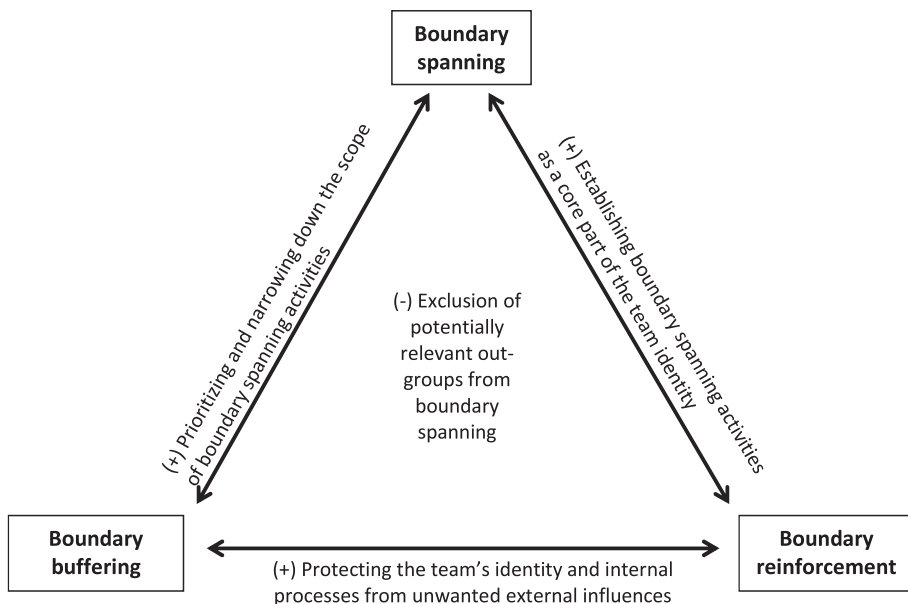


FIGURE 2 Interplay between different types of boundary work in knowledge brokering teams

brokering teams to exercise agency in complex boundary systems in which they are embedded and prioritize external stakeholder groups in terms of their perceived relevance for the project.

Similarly, boundary reinforcement, or bringing up borders (Drach-Zahavy and Somech 2010), can be quite prominent in knowledge brokering teams despite their generally open nature. While one could expect that this type of boundary work will be most pronounced at the inter-organizational boundaries because the perceived distances and differences across the former are more acute than at intra-organizational boundaries (Calvard 2014), in this case the intra-organizational boundary separating the Heart Team from other implementation teams became the main locus of reinforcement. Overall, this study demonstrates the dual effects of boundary reinforcement on boundary spanning. On the one hand, boundary reinforcement may lead to 'othering' and thus limit boundary spanning with certain out-groups, such as the other implementation teams in the case of the Collaboration, hindering cross-project learning (see also Akkerman and Bakker 2011; Kislov 2014). On the other hand, strong intra-team identification (in this case, as a 'knowledge brokering team in the field of heart failure') enables the development of and adherence to a cohesive set of shared norms, values and behaviours establishing boundary spanning with external stakeholders as a core component of the team's remit (also see Marrone et al. 2007; Workman 2007).

5.2 | Selective permeability of the team boundary

Boundary permeability is usually presented either as a binary variable (i.e., thin/thick boundaries) or as a position that a given collective entity occupies in the spectrum from 'open' to 'closed' cultures (Workman 2007; Edmondson and Harvey 2017), with this position being influenced by team boundedness, internal knowledge diversity, extra-team links, leadership style and individual team members' receptivity (Drach-Zahavy 2011; Dibble and Gibson 2018). While recognizing the role of contextual antecedents, such as environmental uncertainty or organizational conflict (Joshi et al. 2009), previous research tends to view team boundary permeability as a function of the team boundary, largely determined by the internal processes unfolding within the team, that is in-group, itself. This study suggests, however, that the interplay between different types of boundary work at the same team boundary may result in its selective permeability in relation to different out-groups with which the team interacts, with this selectivity being shaped by the perceived characteristics of the out-groups, the out-group's modes of participation and the selection of individual boundary spanners (Table 3).

The team boundary is more permeable for knowledge flows with those out-groups whose involvement is collectively perceived to be valuable for the boundary spanning project, aligns with the team's strategic interests and does not lead to competition for recognition and resources. Interestingly, pre-existing substantial differences in domain-specific knowledge between the team and some of the specialized out-groups, such as GPs and specialist nurses, did

TABLE 3 Factors determining the selective permeability of the team boundary

Factor	Dimensions
Perceived characteristics of the out-group	<ul style="list-style-type: none"> – Relevance of the out-group's knowledge and/or skills to the boundary spanning project – Authority and legitimacy of the out-group in its respective social field – Alignment of interests between the out-group and the boundary spanning team – Degree of difference between the out-group and the boundary spanning team – Competition for recognition and resources between the out-group and the boundary spanning team
The out-group's mode of participation	<ul style="list-style-type: none"> – Full participation in shared practices – Knowledge exchange without participation in shared practices – Non-participation
Characteristics of individual boundary spanner(s) operating between the team and the out-group	<ul style="list-style-type: none"> – Complementarity between the designated boundary spanner and the representatives of the out-group involved in the boundary spanning project – The degree to which the designated boundary spanners are involved in the development of the cross-boundary practices – Position of the individual boundary spanner in relation to the core/periphery of the boundary spanning team and the out-group involved

not act as a reliable predictor of low permeability. This highlights that collectively held perceptions about the team's differences and commonalities in relation to various out-groups do not necessarily reflect the underlying epistemic differences but may be actively reconstructed in the process of boundary work in line with the team's strategic focus, task requirements and contextual factors. On the other hand, low permeability of the team boundary in relation to intra-organizational groups despite relatively modest epistemic differences between them resonates with earlier observations that social groups have a vested interest in perceiving greater differentiation between themselves and referent out-groups and that organizational subunits tend to be the primary focus for inter-group comparisons (Ashforth and Mael 1989). This suggests that knowledge brokering teams are not immune to salient cross-project boundaries typical for fragmented project-based organizations (Scarbrough et al. 2004; Kislov 2014).

Boundary permeability may also vary depending on the mode of participation in a boundary spanning project offered to and/or adopted by the out-group. The possible modes of participation illustrated by this empirical case include: active involvement of the out-group's representative(s) in the knowledge brokering team and emerging cross-boundary practices (specialist nurses); exchange of ideas without involvement in the shared practices (hospital consultants and community matrons); and non-participation (other implementation teams in the earlier stages of the project). It has been proposed that active participation in shared practices-in-the-making across the boundaries is a crucial condition for establishing boundary permeability (Levina and Vaast 2005; Kislov 2014) and that the flow of people across the boundary is always a precursor of information flows (Dibble and Gibson 2018). This study highlights that, when perceived inter-group differences are moderate, the boundary may remain impermeable for continuous and intensive involvement (especially leading to the changes in the in-group membership) but may open up for one-off boundary interactions or knowledge exchanges.

Finally, team boundary permeability may also differ depending on which of the team members (or their combinations) are deployed to establish connections between the team and referent out-groups. Previous research has shown that clinicians in designated knowledge brokering roles do not act in isolation but rely on additional 'boundary bridges', usually represented by other clinicians and managers (Kislov et al. 2016), who compensate for their knowledge and status deficiencies and act as 'gatekeepers' to relevant out-groups (Kislov et al. 2017a). This study highlights that the differential effects on boundary permeability exercised by different configurations of the resulting 'chains' of boundary spanners not only depend on the complementarity of skills between its members (Kislov et al. 2016; Kislov et al. 2017a) but are also influenced by the individuals' centrality in relation to the emerging cross-boundary practices-in-the-making. For example, specialist nurses working with the GPs were crucial for bridging the extra-organizational team boundary, but remained relatively peripheral in the intra-organizational context of the Collaboration, having to rely on managers' newly acquired role as intra-organizational boundary spanners. Also, the fact that the intra-organizational boundary spanning potential of academics was never realized despite the similarities in their knowledge base and social position across the implementation teams (Kislov et al. 2017a) underscores the importance of collective intra-team practices, shaping strategic and tactical decisions in relation to the foci and modes of boundary work, for determining whether or not the team will act on specific knowledge brought in by individual boundary spanners depending on the task at hand.

5.3 | Temporal dynamics of boundary phenomena

The findings of this study also address the call for exploring the temporal dynamics of boundary work (Faraj and Yan 2009; Drach-Zahavy and Somech 2010; Marrone 2010; Bucher et al. 2016). First, they indicate that it is not the overall team boundary permeability per se but the deployment of different strategies of boundary work towards specific out-groups that changes over time. In this empirical case, the earlier project stages were dominated by the combination of boundary spanning and boundary reinforcement, involving a wide range of interactions with extra-organizational stakeholders but excluding intra-organizational out-groups, possibly due to the higher level of uncertainty and insecurity in newly created teams, mandating a higher need for team identity formation (Ashforth and

Mael 1989). In the later stages, by contrast, boundary spanning, which was increasingly affected by boundary buffering, became more narrow in scope but deeper in focus, concentrating on a limited number of key stakeholder groups.

Second, this study further develops the conceptualization of boundary work as an active and reflective process (Akkerman and Bakker 2011), whereby the balance between the strategies of engagement and disengagement can be altered by deliberate intervention, with a corresponding effect on boundary permeability. In this empirical case, boundary reinforcement in relation to intra-organizational out-groups became less pronounced over time due to the intervention of the organization's senior leadership aimed at creating new cross-team work practices (cf. transition from 'project-led' to 'business-led' learning in Brady and Davies 2004). The resulting increase of permeability at the intra-organizational boundary may be explained by the previous observation that in the early stages of boundary work distinctions are drawn tentatively and are likely to be amenable to change under the influence of organizational pressure (Hernes 2004). This also concurs with the previous findings about the role of leadership in enabling team boundary spanning (Edmondson et al. 2001; Edmondson 2003; Dey and Ganesh 2017), but suggests that the source of such 'boundary-shifting' influence may be located at the organizational level rather than within the team itself. As far as the role of the team leader in boundary work is concerned, in this empirical case it has actually decreased over time. This can be explained by the relatively non-hierarchical nature of the Heart Team compared with the surgeon-led teams that were the focus of previous research (Edmondson et al. 2001; Edmondson 2003) and by the gradual acquisition of relevant knowledge and skills by more junior boundary spanners (Kislov et al. 2017a).

Finally, I show the flexible and dynamic nature of team members' individual contributions to boundary work. It has been suggested that team members tend to hold specific roles in relation to different boundary activities, with 'sentries and guards', for instance, focusing on boundary buffering (Yan and Louis 1999, p. 31). By contrast, this study demonstrates that individuals can switch between boundary spanning, buffering and reinforcement roles depending on their changing position ('core' or 'peripheral') in relation to the boundary spanning team, relevant out-groups and cross-boundary practices in which they are involved. At the same time, a growing specialization in relation to different boundary spanning activities becomes apparent over time. As the empirical case has highlighted, in the earlier stages of the project, individual contributions of team members to boundary spanning remained relatively undifferentiated, although the level of seniority emerged as the key factor determining participation at representation activities (cf. Glaser et al. 2015). Over time, expertise in certain tasks, rather than professional affiliation or level of seniority, became the key factor determining individual contributions to boundary spanning. Knowledge brokering teams may need to implement additional boundary spanning activities directed at bridging those boundaries (such as the boundary between general practices and specialist nurses) that emerged or were reinforced as a consequence of this specialization.

6 | CONCLUSION

This study contributes to the literature on boundary work by exploring the interplay between its different types at the external team boundary and highlighting both negative and, paradoxically, positive effects that the strategies of disengagement, such as boundary buffering and boundary reinforcement, can have on boundary spanning activities. It shows that the interplay between the strategies of engagement and disengagement involves continuous reconstruction of the external team boundary, which can be both a juncture *and* a barrier, resulting in its selective permeability. By highlighting the individual (e.g., team members' contributions to boundary work), team-level (e.g., shared in-group identity and boundary spanning strategy), organizational (e.g., deliberately orchestrated structural and functional inter-team integration) and supra-organizational (e.g., the features of the broader boundary landscape) factors, this study illuminates both agentic and structural aspects of boundary work and boundary permeability as collectively enacted phenomena.

This work is not without limitations. First, there is an inevitable trade-off between the possibilities the single case study methodology renders in terms of in-depth multi-level analysis versus replicability and generalizability of its

context-specific findings. Second, due to the focus of the study on a specific team, its core members were treated as key informants, and the perspectives of external stakeholder groups, although their representatives were included in the sample, still remained peripheral to the narrative presented in this article. Finally, although the auditing tool developed by the team could be conceptualized as a boundary object directly influencing (and influenced by) team boundary work (Akkerman and Bakker 2011), this line of argument was not developed as doing justice to a separate body of literature in the same article would be highly problematic.

The findings of this study are likely to be applicable to a wide range of collective knowledge brokering agents, such as knowledge mobilization agencies engaged in co-production and other forms of boundary work in the fragmented contexts of networks, partnerships and alliances (Guston 1999; Mørk et al. 2012; Brown and Head 2018; Powell et al. 2018). It also opens a number of avenues for future research. The phenomenon of selective permeability and its effects could be further explored for a range of collective agents engaged in different types of activities and operating in different organizational and policy contexts. In addition, the findings indicate that collective knowledge brokering may go beyond a simple aggregation of individual knowledge brokers' contributions described in the literature (Marrone 2010). Exploring the interplay between the individual and collective elements of knowledge brokering, especially in relation to those internal boundary activities that unfold 'behind the scenes', may provide a fruitful direction for future empirical inquiry.

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APPENDIX 1: Coding different types of boundary work

Type of boundary work	Definition	Illustrative quote
Boundary spanning	General information search	Actions that access outside parties for general or technical information or expertise
	Coordination of task performance	Another key aspect to knowledge transfer ... is about [two junior managers] going out, finding out what the context is and then almost bringing back that knowledge to us for us to think about and think about how to respond ... (BMA1)
	Representation	My responsibility is to actually look at the patient's records and make judgments on that patient's case. ... [The team] support you in that really, because they can be with you in the practice, filling in the template, helping you to pull notes, liaising with practices, arranging education ... (SN8)
Boundary buffering		... I had spent a lot of time ... talking to the medical director and having these conversations ... It was really about that we're not coming in as a university-led initiative to tell primary care what they're doing wrong. It was about working together with people. (CA1)
	An outward-facing strategy of disengagement, whereby a team closes itself off from exposure to the environment to protect itself against external uncertainties and disturbances	... I've had e-mails in capitals [from heart failure specialist nurses], who've said, 'I really think this should be specialist people, people like GPs with the special interests, or heart failure nurses, not community matrons who are involved in this project.' So there's that barrier, they don't feel that

APPENDIX 1 (Continued)

Type of boundary work	Definition	Illustrative quote
		the community matrons should be involved in the education. (M1) <i>[As a result, community matrons were excluded from the project to avoid the conflict between the Heart Team and specialist nurses]</i>
Boundary reinforcement	An inward-facing strategy of disengagement, whereby a team internally sets and reclaims its boundaries and sharpens team identity	So I think some of the challenge has been: what will other [implementation teams] think when we've actually spent a lot of time developing really good relations ... And I don't know if that has been a challenge or not. One of the reasons why I don't think it has been a challenge is because I think we're actually really quite a strong and confident group, so we're tending to think that it's actually better this way and we're doing it the way that it should be done. (BMA1)

APPENDIX 2: Development of team boundary work and boundary permeability over time

Boundary	Theme	Design and piloting	Implementation and spread
Boundary between the Heart Team and external professional and organizational groups operating in the field of heart failure (<i>extra-organizational team boundary</i>)	Boundary work	<ul style="list-style-type: none"> – Broad but relatively 'shallow' interactions with multiple groups, resulting in an extensive network of contacts – Emphasizing complementarity and synergy, rather than competition, with powerful stakeholder groups – Exclusion of secondary care consultants under the influence of GPs with specialist interest – Marginalization of community matrons and active case managers, seen as underqualified by the specialist nurses 	<ul style="list-style-type: none"> – A more narrow but focused approach to boundary spanning, with the increasing prominence of commissioners, heart failure specialist nurses and GPs with special interest in heart failure – Specialist nurses act as key clinical boundary spanners with general practices; at the same time, education that they deliver is occasionally seen as 'too specialized' by the primary care staff, and the auditing tool can only be operated by the specialist nurses themselves
	Variability across different team members	<ul style="list-style-type: none"> – Representation at the senior level is undertaken mainly by the clinical lead – Interaction with general practices is a joint responsibility of managers and specialist nurses 	<ul style="list-style-type: none"> – The boundary spanning role of the clinical lead is decreasing, with managers taking over the representational function at the senior level – Specialization of boundary spanners: specialist nurses are in charge of clinical tasks whereas managers coordinate administrative tasks
	Boundary permeability	<ul style="list-style-type: none"> – Permeable for the input from various groups outside the Collaboration – The views of some stakeholder groups inform the development of the project although these groups are excluded from active participation 	<ul style="list-style-type: none"> – Additional measures have to be introduced to counterbalance the specialist-generalist boundary reinforced by the project: involving generalist staff in education; pairing of specialist nurses with managers during feedback sessions

APPENDIX 2 (Continued)

Boundary	Theme	Design and piloting	Implementation and spread
Boundary between the Heart Team and other implementation teams within the Collaboration (<i>intra-organizational team boundary</i>)	Boundary work	<ul style="list-style-type: none"> – Emphasizing the ‘uniqueness’ of the heart failure project – Development of a strong team identity to the detriment of organizational identification – Competition for recognition and resources between the implementation teams 	<ul style="list-style-type: none"> – Partially successful organizational attempts to bridge the boundary by introducing staff rotation, cross-team meetings and the development of new projects bringing together the representatives of different themes
	Variability across different team members	<ul style="list-style-type: none"> – Cross-cutting structures bringing together managers and (separately) academics from different teams – No positive effect on boundary spanning due to the absence of shared cross-project practices 	<ul style="list-style-type: none"> – Clinically focused boundary spanners (specialist nurses) still rely heavily on managerial staff when it comes to spanning the intra-organizational boundary
	Boundary permeability	<ul style="list-style-type: none"> – Limited permeability for the input from other implementation teams within the Collaboration – Cross-project learning is minimal 	<ul style="list-style-type: none"> – More permeable (than in the exploration phase) for staff coming from other implementation teams within the Collaboration